

Integrated Sustainable Landscaping at the Oak Ridge National Laboratory

The Oak Ridge National Laboratory (ORNL) recognized that it had an industrial / ad hoc landscape and developed a "Master Plan" to transform ORNL into a true research campus. ORNL also is committed to implementing a sustainable campus "from the ground up" and in March 2003 published the *Oak Ridge National Laboratory Conceptual Landscape Plan and Design Guidelines*. To ensure that this master landscape plan met all of the current and future sustainable needs of the lab, it defines specific goals and objectives as well as focusing on key areas. This holistic technique also ties elements of the campus together and establishes a cohesive identity. This master plan provides a foundation and template that the lab then follows as it transforms its landscaping through the appropriate use of plant species with an emphasis on native plants, planting and seeding techniques, planting and seeding schedules, landscape management principles, and landscape lighting principles. This holistic effort

also includes the planned elimination of invasive, non-native plants and expands beyond ORNL to all of the Oak Ridge Reservation.

OAK RIDGE NATIONAL LABORATORY
CONCEPTUAL LANDSCAPE PLAN &
DESIGN GUIDELINES

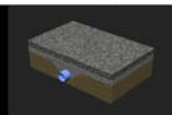


Use of Native Plants in
Landscaping

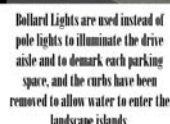
Perforated pipes under the pervious pavement collect excess rainwater, enabling the pavement, soil, and plant material to also provide as a filter that removes pollutants.

East Campus Visitor Parking Court Goes Green

The pervious pavements and shade trees are placed in the parking lot to reduce the heat gain of the parking area which in turn reduces the energy needs of the buildings.



The perforated pipes convey the water to the landscape area on the lower terrace which enables cleaner water, reduced reliance on irrigation, and less water entering the storm sewer.



Bollard Lights are used instead of pole lights to illuminate the drive aisle and to demarcate each parking space, and the curbs have been removed to allow water to enter the landscape islands.

Successful implementation of this plan at ORNL has:


- Supported LEED certification of several buildings
- Reduced natural resources use including water harvesting, solar heating, recycled-content and durable materials
- Enhanced impact on the environment including "night-sky friendly" lighting,

improved water quality in pond, long-term vision and diverse habitats and plantings, native plantings [11 acres at ORNL and 250 acres across the Oak Ridge Reservation (ORR)], removal of invasive plants (35 acres at ORNL and 350 acres across the ORR), and minimal maintenance/adapted native plant landscaping requiring little or no fertilization

- Long-term sustainable environment at the Laboratory including arrival terrace with native plantings at Visitor Center, varied landscaping, increased landscaping and management techniques to discourage nuisance wildlife, ADA-compliant exterior gathering spaces, and integration of art and science.

OAK RIDGE NATIONAL LABORATORY
U. S. DEPARTMENT OF ENERGY






Kudzu Flower

Management of Invasive Plants on the Oak Ridge Reservation

Pat Parr, ORNL Natural Resource Manager




Japanese Stiltgrass (Microstegium)

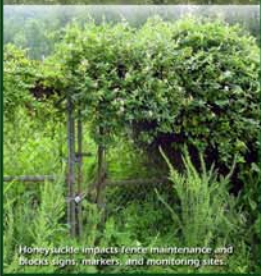
Invasive plants reproduce quickly, are hardy, and have no natural controls. Executive Order 13112 requires federal agencies to help prevent introduction of invasive species and to control them.

ORR Impacts Include

- Increasing maintenance costs for ORR infrastructure
- Displacing native flora
- Affecting security and safety
- Transporting contaminants
- Heightening wildfire hazards
- Influencing compliance monitoring and research sites
- Disrupting natural biological community processes
- Altering visual landscape
- Spreading to lands neighboring the ORR



Autumn olive, bush honeysuckle, and privet can form solid masses along utility corridors and roadsides that are impenetrable to wildlife.




Honeyuckle impacts fence maintenance and blocks signs, markers, and monitoring sites.

Almost 170 species of nonnative plants grow on the Department of Energy's 34,000 acre Oak Ridge Reservation. Of these, about 45 are aggressive and cause problems.


ORR Aggressive Invasive Plants

Tree-of-heaven*	Chinese lespedeza*	Smartweed
Field garlic*	Chinese privet*	Curly pondweed
Green amaranthus	Japanese honeysuckle*	Kudzu*
Jointed grass	Moneywort	Multiflora rose*
Oriental bittersweet*	Purple loosestrife	Clustered dock
Bull thistle*	Crown vetch*	Johnson grass*
Crown vetch*	Oregon grape	Stinging nettle
Chinese yam*	Spearmint*	Corn speedwell
Barney grass	Peppermint	Common speedwell
Thorny autumn olive	Microstegium*	Thyme-leaved speedwell
Autumn olive*	Eurasian water-milfoil	Hairy vetch
Ground ivy	Watercress*	Common periwinkle*
Korean bush clover	Empress tree*	Japanese knotweed
Japanese clover	Common plantain	
Shrubby bush clover	Kentucky bluegrass	

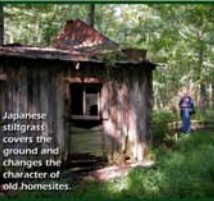
*ORR most problematic




Japanese stiltgrass blankets dirt roads and moves into moist shady areas, including field research sites.



Kudzu growing up utility poles and into lines can result in fires.




Japanese stiltgrass covers the ground and changes the character of old homesteads.



Process tree germinates in cracks of asphalt causing severe buckling as it grows.

Prioritization Methodology

- Level of threat (Invasive Plant List ranking)
- Operational/Mission impact
- Sensitive area impact
- Reproductive capability
- Density
- Dispersal corridor
- New infestation
- Treatment history
- Collaboration/leverage of resources




Invasive plant training for incorporation of control into routine maintenance programs.

Timing of Treatments


F = Foliar C = Cut Surface B = Basal Bark

Plant group	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Deciduous trees	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB
Deciduous shrubs	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB
Deciduous vines	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB
Evergreen shrubs	FCB	FCB	FCB	FCB	FCB	FCB	FCB	FCB	FCB	FCB	FCB	FCB
Evergreen vines	FCB	FCB	FCB	FCB	FCB	FCB	FCB	FCB	FCB	FCB	FCB	FCB
Legumes												
Conifers												
Palms												
Monocots												
Forbs												
Grasses												
Nonvascular plants												


Red indicates optimal treatment type for that month.



Kudzu treatment area at Hwy 95/ Bear Creek Rd intersection



Mechanized treatment of large areas of invasives



Selective treatment of invasives in complex or sensitive sites

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